

Claims 1-6 (canceled)

Claim 7 (new): Method for high-speed production of high quality laser-induced damage images inside transparent material comprising:

division of the said image on several image areas so that damages corresponding to the pixels of the each said image area can be produced by the deflection (the scan) of laser beam without displacement of the said transparent material and the laser relative to one another;

broadening of the angle, in which laser-induced damages can be produced with prescribed sizes by scanning laser beam without displacement of the said transparent material and the laser relative to one another;

focusing laser radiation at the predetermined points so that laser-induced damages have given sizes and orientation;

creation of the said laser-induced damages corresponding to different said image areas by the displacement of the said transparent material and the laser relative to one another.

Claim 8 (new): System for high-speed production of high quality laser-induced damage image within transparent material comprising:

means for the determination of the image areas, pixels of which correspond to the laser-induced damages, which can be produced by scanning laser beam without displacement of the said transparent material and the laser relative to one another;

means for the scan of the laser beam so that it can be focused at the predetermined points of the said transparent material without displacement of the said transparent material and the laser relative to one another;

means for the increase of the bound of the angle, in which laser-induced damages can be produced with prescribed sizes by scanning laser beam without displacement of the said transparent material and the laser relative to one another;

means for the displacement of the said transparent material and the laser relatively one another.

Claim 9 (new): The system in accordance with claim 8 wherein special mirrors and focused lenses direct and focus scanned laser beam at the predetermined points of the transparent material so that the said beam is perpendicular to the article surface.

Claim 10 (new): The system in accordance with claim 8 wherein each laser-induced damage is created as a result of intersection of two mutually perpendicular beams; the beams are generated by a beam-splitter, which divides the original beam into two beams; one of these beams is directed by the transfer mirrors to the optical system which focuses it at the right point of the article; another beam is directed into the optical system which transforms it into the flat beam; the said flat beam intersects the said focal spot of the first beam; the energy levels of these beams are controlled so that the breakdown is generated only at the intersection area.

Claim 11 (new): The system for high-speed production of high quality laser-induced damage images comprising:

- a pulsed laser for generating a high energy density laser beam to which the material is transparent;
- a beam-splitter, a beam expander, transfer mirrors, a beam deflector;
- means for creation of several separate breakdown centers inside each laser-induced damage wherein these centers are generated by using the computing phase hologram; the right phase structure of the computing phase hologram is calculated so that the laser beam passing through the hologram is focused at several spots; these spots are located inside damage area and the distances between adjacent spots are larger than distance threshold d_0 (d_0 is minimal distance which permits to avoid an internal split between the separate small damages inside the damage area);
- means for creation of two laser beams directed inside the article from two mutually perpendicular directions;
- means for creating the flat laser beam, allowing to control its thickness;
- means for controlling longitudinal size of the laser-induced damage;

- means for movement of a damage area inside the transparent material by successive displacement of the article (or the optical system) and by the deflection of laser beam inside the right space angle;
- computer system, controlling the operation of the said devices.

Respectfully submitted,

by

Troitski

Igor Troitski.

853 Arrowhead Trail

Henderson, NV 89015

11/06/2003